

## 高速 PWM コントローラ

### 1 特長

- UC3823/UC3825 PWM の改良バージョン
- 電圧モードまたは電流モードの制御方式と互換
- 最大 1 MHz のスイッチング周波数で実用的な動作
- 出力への伝搬遅延 50ns
- 大電流のデュアル・トータム・ポール出力 (2A ピーク)
- トリムされた発振器放電電流
- 100μA の低スタートアップ電流
- パルス単位の電流制限コンパレータ
- フル・サイクル再起動付きのラッチ付き過電流コンパレータ

### 2 概要

UC3823A と UC3823B、UC3825A と UC3825B ファミリの PWM コントローラは、標準の UC3823 と UC3825 ファミリの改良版です。いくつかの回路ブロックで性能が強化されています。エラー・アンプのゲイン帯域幅積は 12MHz、入力オフセット電圧は 2mV です。電流制限スレッシュホールドは、公差 5% が保証されています。発振器の放電電流は 10mA で規定されており、正確なデッドタイム制御が可能です。周波数精度が 6% に向上しています。スタートアップ時の消費電流は標準値 100μA で、オフライン・アプリケーションに最適です。出力ドライバは、スタートアップの電流仕様を増やすことなく UVLO 時に電流をアクティブにシンクするよう再設計されています。さらに、各出力は遷移中に 2A のピーク電流を供給できます。

このファミリでは、機能の改善も実装されています。UC3825 のシャットダウン・コンパレータは、スレッシュホールドが 1.2V の高速過電流コンパレータになりました。この過電流コンパレータはラッチをセットし、これによって再起動が許可される前にソフト・スタート・コンデンサが完全に放電されることを保証します。フォルト・ラッチがセットされている間、出力は Low 状態になります。連続的に障害が発生した場合、ソフト・スタート・コンデンサは放電前に完全に充電され、フォルトの頻度が設計されたソフト・スタート期間を超えないことを保証します。UC3825 の CLOCK ピンは CLK/LEB に変更されました。このピンは、クロック出力とリーディング・エッジ・ブランキング調整の機能を組み合わせたもので、簡単に接続できるようバッファされています。

UC3825A と UC3825B は、UC3825 と同じピン構成で、デュアル交互出力が搭載されています。UC3823A と UC3823B の出力は位相で動作し、デューティ・サイクルは 0 から 100% 未満です。UC3823A と UC3823B のピン構成は UC3823 と同じですが、ピン 11 は電流制限コンパレータへのリファレンス電圧ピンではなく、出力ピンになりました。A バージョンの部品の UVLO スレッシュホールドは、元の UC3823 および UC3825 と同じです。B バージョンの UVLO スレッシュホールドは 16V と 10V で、オフライン・アプリケーションでの使いやすさを意図しています。

詳細な技術情報とアプリケーション情報については、アプリケーション・ノート「UC3823A、B および UC3825A、B 拡張世代の PWM コントローラ」(SLUA125) を参照してください。

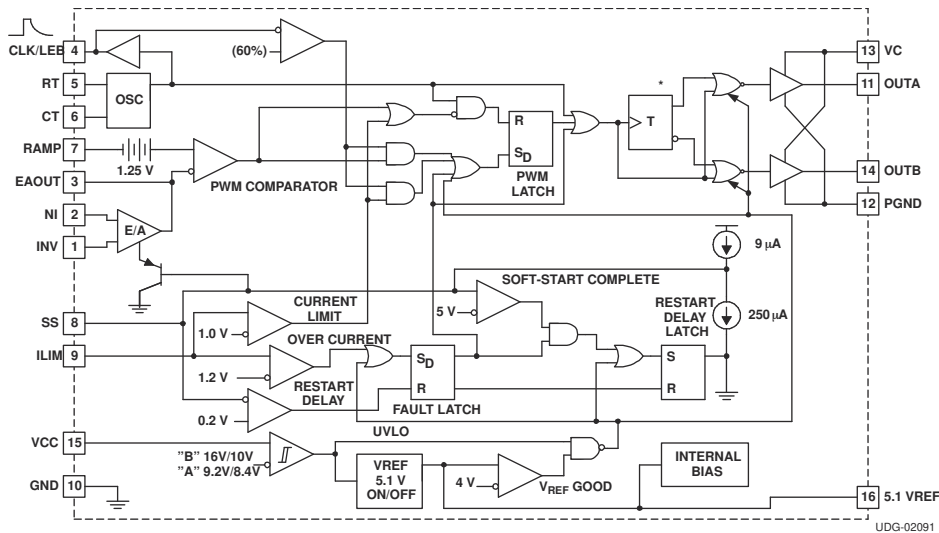


図 2-1. ブロック図



## Table of Contents

<b>1 特長</b> .....	1	7.3 ACTIVE LOW OUTPUTS DURING UVLO.....	10
<b>2 概要</b> .....	1	7.4 CONTROL METHODS.....	10
<b>3 Revision History</b> .....	2	7.5 SYNCHRONIZATION.....	10
<b>4 Ordering Information</b> .....	3	7.6 HIGH CURRENT OUTPUTS.....	11
<b>5 Pin Configuration and Functions</b> .....	3	7.7 GROUND PLANES.....	12
Terminal Functions.....	4	7.8 OPEN LOOP TEST CIRCUIT.....	13
<b>6 Specifications</b> .....	5	<b>8 Device and Documentation Support</b> .....	14
6.1 ABSOLUTE MAXIMUM RATINGS.....	5	8.1 Documentation Support.....	14
6.2 Thermal Information.....	5	8.2 Receiving Notification of Documentation Updates....	14
6.3 ELECTRICAL CHARACTERISTICS.....	6	8.3 サポート・リソース.....	14
6.4 ELECTRICAL CHARACTERISTICS.....	7	8.4 Trademarks.....	14
<b>7 Application and Implementation</b> .....	8	8.5 Electrostatic Discharge Caution.....	14
7.1 LEADING EDGE BLANKING.....	8	8.6 Glossary.....	14
7.2 UVLO、ソフト・スタート、フォルト管理.....	9	<b>9 Mechanical, Packaging, and Orderable Information..</b>	<b>15</b>

### 3 Revision History

資料番号末尾の英字は改訂を表しています。その改訂履歴は英語版に準じています。

<b>Changes from Revision E (September 2010) to Revision F (August 2022)</b>	<b>Page</b>
• Added SOIC package.....	3
• Added Thermal Information.....	5

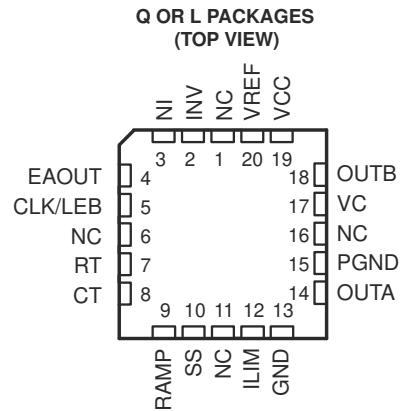
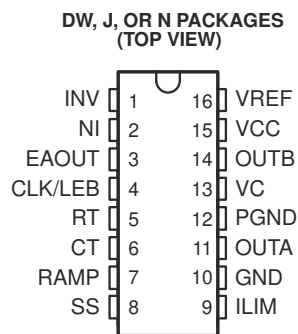
## 4 Ordering Information

T <sub>A</sub>	MAXIMUM DUTY CYCLE	UVLO					
		9.2 V / 8.4 V			16 V / 10 V		
		SOIC-16 <sup>(1)</sup> (DW)	PDIP-16 (N)	PLCC-20 <sup>(1)</sup> (Q)	SOIC-16 (DW)	PDIP-16 (N)	PLCC-20 <sup>(1)</sup> (Q)
40°C to 85°C	< 100%	UC2823ADW	UC2823AN	UC2823AQ	UC2823BDW	UC2823BN	
	< 50%	UC2825ADW	UC2825AN	UC2825AQ	UC2825BDW	UC2825BN	
0°C to 70°C	< 100%	UC3823ADW	UC3823AN	UC3823AQ	UC3823BDW	UC3823BN	
	< 50%	UC3825ADW	UC3825AN	UC3825AQ	UC3825BDW	UC3825BN	UC3825BQ

(1) The DW and Q packages are also available taped and reeled. Add TR suffix to the device type (i.e., UC2823ADWR). To order quantities of 1000 devices per reel for the Q package and 2000 devices per reel for the DW package.

## 5 Pin Configuration and Functions

T <sub>A</sub>	MAXIMUM DUTY CYCLE	UVLO (9.2 V/8.4 V)	
		CDIP-16 (J)	LCCC-20 (L)
55°C to 125°C	< 100%	UC1823AJ, UC1823AJ883B, UC1823AJQMLV	UC1823AL, UC1823AL883B
	< 50%	UC1825AJ, UC1825AJ883B, UC1825AJQMLV	UC1825AL, UC1825AL883B, UC1825ALQMLV



NC = no connection

## Terminal Functions

TERMINAL			I/O	DESCRIPTION
NAME	NO.			
	J, N, or DW	Q or L		
CLK/LEB	4	5	O	Output of the internal oscillator
CT	6	8	I	Timing capacitor connection pin for oscillator frequency programming. The timing capacitor should be connected to the device ground using minimal trace length.
EAOUT	3	4	O	Output of the error amplifier for compensation
GND	10	13		Analog ground return pin
ILIM	9	12	I	Input to the current limit comparator
INV	1	2	I	Inverting input to the error amplifier
NI	2	3	I	Non-inverting input to the error amplifier
OUTA	11	14	O	High current totem pole output A of the on-chip drive stage.
OUTB	14	18	O	High current totem pole output B of the on-chip drive stage.
PGND	12	15		Ground return pin for the output driver stage
RAMP	7	9	I	Non-inverting input to the PWM comparator with 1.25-V internal input offset. In voltage mode operation, this serves as the input voltage feed-forward function by using the CT ramp. In peak current mode operation, this serves as the slope compensation input.
RT	5	7	I	Timing resistor connection pin for oscillator frequency programming
SS	8	10	I	Soft-start input pin which also doubles as the maximum duty cycle clamp.
VC	13	17		Power supply pin for the output stage. This pin should be bypassed with a 0.1- $\mu$ F monolithic ceramic low ESL capacitor with minimal trace lengths.
VCC	15	19		Power supply pin for the device. This pin should be bypassed with a 0.1- $\mu$ F monolithic ceramic low ESL capacitor with minimal trace lengths
VREF	16	20	O	5.1-V reference. For stability, the reference should be bypassed with a 0.1- $\mu$ F monolithic ceramic low ESL capacitor and minimal trace length to the ground plane.

## 6 Specifications

### 6.1 ABSOLUTE MAXIMUM RATINGS

over operating free-air temperature range unless otherwise noted<sup>(1)</sup>

			VALUE	UNIT
V <sub>IN</sub>	Supply voltage,	VC, VCC	22	V
I <sub>O</sub>	Source or sink current,DC	OUTA, OUTB	0.5	A
I <sub>O</sub>	Source or sink current, pulse (0.5 μs)	OUTA, OUTB	2.2	A
Analog inputs		INV, NI, RAMP	-0.3 to 7	V
		ILIM, SS	-0.3 to 6	V
Power ground		PGND	±0.2	V
I <sub>CLK</sub>	Clock output current	CLK/LEB	-5	mA
I <sub>O(EA)</sub>	Error amplifier output current	EAOUT	5	mA
I <sub>SS</sub>	Soft-start sink current	SS	20	mA
I <sub>OSC</sub>	Oscillator charging current	RT	-5	mA
T <sub>J</sub>	Operating virtual junction temperature range		-55 to 150	°C
T <sub>stg</sub>	Storage temperature		-65 to 150	°C
	Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds		-55 to 150	°C
t <sub>STG</sub>	Storage temperature		-65 to 150	°C
	Lead temperature 1,6 mm (1/16 inch) from cases for 10 seconds		300	°C

- (1) Stresses beyond those listed under *absolute maximum ratings* may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *recommended operating conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

### 6.2 Thermal Information

PACKAGE	θ <sub>JA</sub>	θ <sub>JC</sub>
J-16	80-120	28 <sup>(2)</sup>
N-16	90 <sup>(1)</sup>	45
DW-16	45-90 <sup>(1)</sup>	25
PLCC-20 (Q package)	43-75 <sup>(1)</sup>	34
LCC-20 (L package)	70-80	20 <sup>(2)</sup>

- (1) Specified θ<sub>JA</sub> (junction to ambient) is for devices mounted to 5 in2 FR4 PC board with one ounce copper where noted. When resistance range is given, lower values are for 5 in2 aluminum PC board. Test PWB was 0.062" thick and typically used 0.635 mm trace widths for power packages and 1.3 mm trace widths for non-power packages with 100 x 100 mil probe land area at the end of each trace.
- (2) θ<sub>JC</sub> data values stated were derived from MIL-STD-1835B. MIL-STD-1835B states, "The baseline values shown are worst case (mean + 2s) for a 60 x 60 mil microcircuit device silicon die and applicable for devices with die sizes up to 14400 square mils. For device die size greater than 14400 square mils use the following values; dual-in-line, 11°C/W; flat pack, 10°C/W; pin grid array, 10°C/W".

### 6.3 ELECTRICAL CHARACTERISTICS

$T_A = -55^\circ\text{C}$  to  $125^\circ\text{C}$  for the UC1823A/UC1825A,  $T_A = -40^\circ\text{C}$  to  $85^\circ\text{C}$  for the UC2823x/UC2825x,  $T_A = 0^\circ\text{C}$  to  $70^\circ\text{C}$  for the UC3823x/UC3825x,  $R_T = 3.65\text{ k}\Omega$ ,  $C_T = 1\text{ nF}$ ,  $V_{CC} = 12\text{ V}$ ,  $T_A = T_J$  (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>REFERENCE, <math>V_{REF}</math></b>						
$V_O$	Output voltage range	$T_J = 25^\circ\text{C}$ , $I_O = 1\text{ mA}$	5.05	5.1	5.15	V
	Line regulation	$12\text{ V} \leq V_{CC} \leq 20\text{ V}$		2	15	mV
	Load regulation	$1\text{ mA} \leq I_O \leq 10\text{ mA}$		5	20	
	Total output variation	Line, load, temperature	5.03		5.17	V
	Temperature stability <sup>(1)</sup>	$T_{(min)} < T_A < T_{(max)}$		0.2	0.4	mV/°C
	Output noise voltage <sup>(1)</sup>	$10\text{ Hz} < f < 10\text{ kHz}$		50		$\mu\text{V}_{RMS}$
	Long term stability <sup>(1)</sup>	$T_J = 125^\circ\text{C}$ , 1000 hours		5	25	mV
	Short circuit current	$V_{REF} = 0\text{ V}$	30	60	90	mA
<b>OSCILLATOR</b>						
$f_{OSC}$	Initial accuracy <sup>(1)</sup>	$T_J = 25^\circ\text{C}$	375	400	425	kHz
		$R_T = 6.6\text{ k}\Omega$ , $C_T = 220\text{ pF}$ , $T_A = 25^\circ\text{C}$	0.9	1	1.1	
	Total variation <sup>(1)</sup>	Line, temperature	350		450	kHz
		$R_T = 6.6\text{ k}\Omega$ , $C_T = 220\text{ pF}$	0.85		1.15	
	Voltage stability	$12\text{ V} < V_{CC} < 20\text{ V}$			1%	
	Temperature stability <sup>(1)</sup>	$T_{(min)} < T_A < T_{(max)}$		$\pm 5\%$		
	High-level output voltage, clock		3.7	4		V
	Low-level output voltage, clock			0	0.2	
	Ramp peak		2.6	2.8	3	
	Ramp valley		0.7	1	1.25	
	Ramp valley-to-peak		1.6	1.8	2	
$I_{OSC}$	Oscillator discharge current	$R_T = \text{OPEN}$ , $V_{CT} = 2\text{ V}$	9	10	11	mA
<b>ERROR AMPLIFIER</b>						
	Input offset voltage			2	10	mV
	Input bias current			0.6	3	$\mu\text{A}$
	Input offset current			0.1	1	
	Open loop gain	$1\text{ V} < V_O < 4\text{ V}$	60	95		dB
CMRR	Common mode rejection ratio	$1.5\text{ V} < V_{CM} < 5.5\text{ V}$	75	95		
PSRR	Power supply rejection ratio	$12\text{ V} < V_{CC} < 20\text{ V}$	85	110		
$I_{O(sink)}$	Output sink current	$V_{EAOUT} = 1\text{ V}$	1	2.5		mA
$I_{O(src)}$	Output source current	$V_{EAOUT} = 4\text{ V}$		-1.3	-0.5	
	High-level output voltage	$I_{EAOUT} = -0.5\text{ mA}$	4.5	4.7	5	V
	Low-level output voltage	$I_{EAOUT} = -1\text{ mA}$	0	0.5	1	
	Gain bandwidth product	$f = 200\text{ kHz}$	6	12		Mhz
	Slew rate <sup>(1)</sup>		6	9		V/ $\mu\text{s}$

(1) Ensured by design. Not production tested.

## 6.4 ELECTRICAL CHARACTERISTICS

$T_A = -55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$  for the UC1823A/UC1825A,  $T_A = -40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  for the UC2823x/UC2825x,  $T_A = 0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$  for the UC3823x/UC3825x,  $R_T = 3.65\text{ k}\Omega$ ,  $C_T = 1\text{ nF}$ ,  $V_{CC} = 12\text{ V}$ ,  $T_A = T_J$  (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>PWM COMPARATOR</b>						
$I_{BIAS}$	Bias current, RAMP	$V_{RAMP} = 0\text{ V}$		-1	-8	$\mu\text{A}$
	Minimum duty cycle				0%	
	Maximum duty cycle		85%			
$t_{LEB}$	Leading edge blanking time	$R_{LEB} = 2\text{ k}\Omega$ , $C_{LEB} = 470\text{ pF}$	300	375	450	ns
$R_{LEB}$	Leading edge blanking resistance	$V_{CLK/LEB} = 3\text{ V}$	8.5	10.0	11.5	k $\Omega$
$V_{ZDC}$	Zero dc threshold voltage, EAOUT	$V_{RAMP} = 0\text{ V}$	1.10	1.25	1.4	V
$t_{DELAY}$	Delay-to-output time <sup>(1)</sup>	$V_{EAOUT} = 2.1\text{ V}$ , $V_{ILIM} = 0\text{ V}$ to $2\text{ V}$ step		50	80	ns
<b>CURRENT LIMIT / START SEQUENCE / FAULT</b>						
$I_{SS}$	Soft-start charge current	$V_{SS} = 2.5\text{ V}$	8	14	20	$\mu\text{A}$
$V_{SS}$	Full soft-start threshold voltage		4.3	5		V
$I_{DSCH}$	Restart discharge current	$V_{SS} = 2.5\text{ V}$	100	250	350	$\mu\text{A}$
$I_{SS}$	Restart threshold voltage			0.3	0.5	V
$I_{BIAS}$	ILIM bias current	$V_{ILIM} = 0\text{ V}$ to $2\text{ V}$ step			15	$\mu\text{A}$
$I_{CL}$	Current limit threshold voltage		0.95	1	1.05	V
	Overcurrent threshold voltage		1.14	1.2	1.26	
$t_d$	Delay-to-output time, ILIM <sup>(1)</sup>	$V_{ILIM} = 0\text{ V}$ to $2\text{ V}$ step		50	80	ns
<b>OUTPUT</b>						
	Low-level output saturation voltage	$I_{OUT} = 20\text{ mA}$		0.25	0.4	V
		$I_{OUT} = 200\text{ mA}$		1.2	2.2	
	High-level output saturation voltage	$I_{OUT} = -20\text{ mA}$		1.9	2.9	
		$I_{OUT} = -200\text{ mA}$		2	3	
$t_r$ , $t_f$	Rise/fall time <sup>(1)</sup>	$C_L = 1\text{ nF}$		20	45	ns
<b>UNDERVOLTAGE LOCKOUT (UVLO)</b>						
	Start threshold voltage	UC2823B, UC2825B, UC3825B, UC3825B		16	17	V
		UC1823A, UC1825A, UC2823A, UC2825A UC3825A, UC3825A		8.4	9.2	
	Stop threshold voltage	UC2823B, UC2825B, UC3825B, UC3825B		9	10	
	OVLO hysteresis	UC1823A, UC1825A, UC2823A, UC2825A UC3825A, UC3825A		0.4	0.8	
		UC2823B, UC2825B, UC3825B, UC3825B		5	6	7
<b>SUPPLY CURRENT</b>						
$I_{su}$	Startup current	$V_C = V_{CC} = V_{TH}(\text{start}) - 0.5\text{ V}$		100	300	$\mu\text{A}$
$I_{CC}$	Input current			28	36	mA

(1) Ensured by design. Not production tested.

## 7 Application and Implementation

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### 注

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes, as well as validating and testing their design implementation to confirm system functionality.

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### 7.1 LEADING EDGE BLANKING

The UC3823A, UC2823B, UC3825A, and UC3825B perform fixed frequency pulse width modulation control. The UC3823A, and UC3823B outputs operate together at the switching frequency and can vary from zero to some value less than 100%. The UC3825A and UC3825B outputs are alternately controlled. During every other cycle, one output is off. Each output then switches at one-half the oscillator frequency, varying in duty cycle from 0 to less than 50%.

To limit maximum duty cycle, the internal clock pulse blanks both outputs low during the discharge time of the oscillator. On the falling edge of the clock, the appropriate output(s) is driven high. The end of the pulse is controlled by the PWM comparator, current limit comparator, or the overcurrent comparator.

Normally the PWM comparator senses a ramp crossing a control voltage (error amplifier output) and terminates the pulse. Leading edge blanking (LEB) causes the PWM comparator to be ignored for a fixed amount of time after the start of the pulse. This allows noise inherent with switched mode power conversion to be rejected. The PWM ramp input may not require any filtering as result of leading edge blanking.

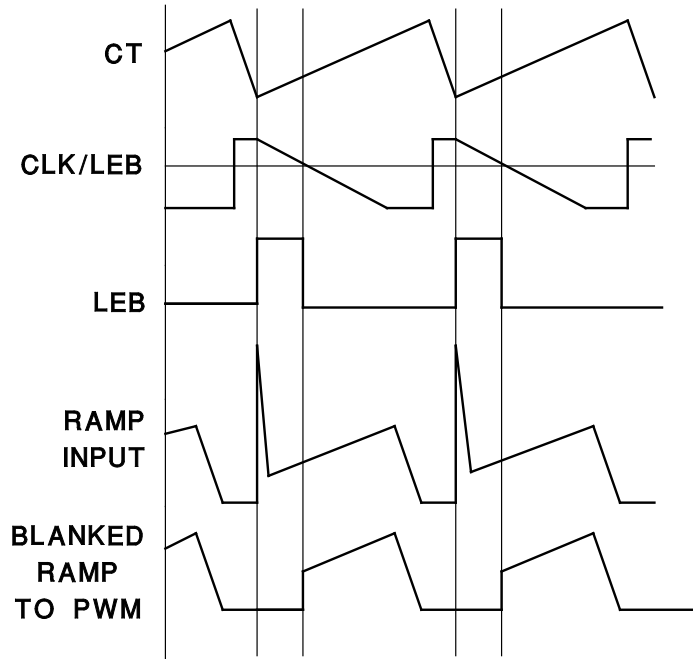
To program a leading edge blanking (LEB) period, connect a capacitor, C, to CLK/LEB. The discharge time set by C and the internal 10-k $\Omega$  resistor determines the blanked interval. The 10-k $\Omega$  resistor has a 10% tolerance. For more accuracy, an external 2-k $\Omega$  1% resistor (R) can be added, resulting in an equivalent resistance of 1.66 k $\Omega$  with a tolerance of 2.4%. The design equation is:

$$t_{LEB} = 0.5 \times (R \parallel 10 \text{ k}\Omega) \times C \quad (1)$$

Values of R less than 2 k $\Omega$  should not be used.

Leading edge blanking is also applied to the current limit comparator. After LEB, if the ILIM pin exceeds the 1-V threshold, the pulse is terminated. The overcurrent comparator, however, is not blanked. It catches catastrophic overcurrent faults without a blanking delay. Any time the ILIM pin exceeds 1.2 V, the fault latch is set and the outputs driven low. For this reason, some noise filtering may be required on the ILIM pin.





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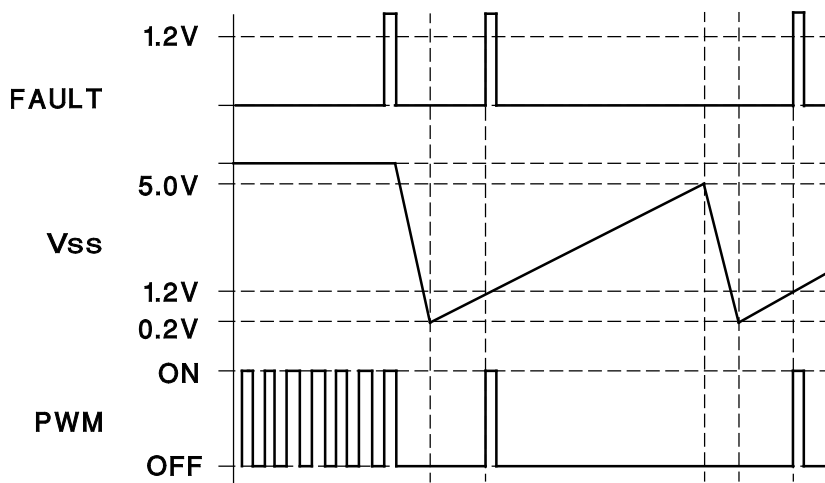
図 7-1. Leading Edge Blanking Operational Waveforms

## 7.2 UVLO、ソフト・スタート、フォルト管理

ソフト・スタートは、SS ピンのコンデンサでプログラムされます。電源投入時には SS が放電されます。SS が Low のとき、エラー・アンプの出力も強制的に Low になります。内部の  $9\mu\text{A}$  ソースが SS ピンを充電している間、エラー・アンプの出力は、閉ループ・レギュレーションが行われるまで SS ピンに追従します。

ILIM が  $1.2\text{V}$  を超えるとフォルト・ラッチがセットされ、出力ピンが Low に駆動されます。その後、ソフト・スタート・コンデンサは  $250\mu\text{A}$  の電流シンクによって放電されます。ソフト・スタートが完全に放電され、ILIM が  $1.2\text{V}$  未満になるまで、それ以上の出力パルスは許容されません。ILIM が  $1.2\text{V}$  未満になるとフォルト・ラッチがリセットされ、チップがソフト・スタートを実行します。

ソフト・スタート時にフォルト・ラッチがセットされた場合、出力は直ちに終了しますが、ソフト・スタート・コンデンサは一度完全に充電されるまで放電しません。これによって、連続的にフォルトが発生した場合にヒカップ間隔が制御されます。

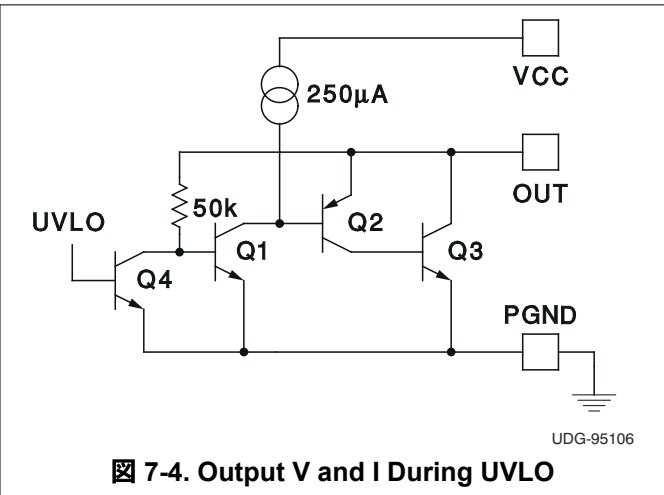
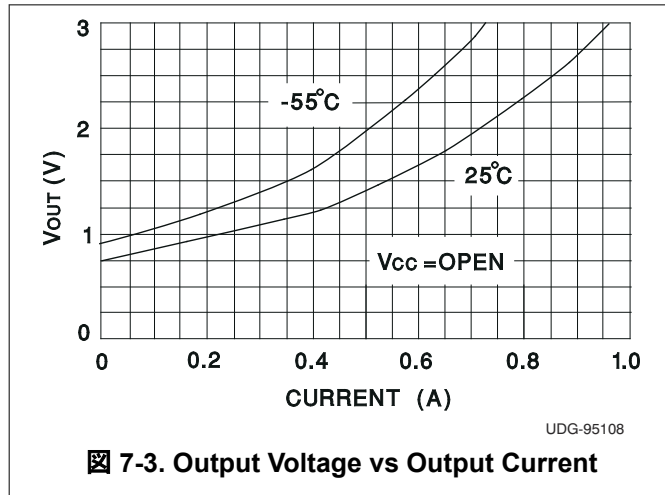


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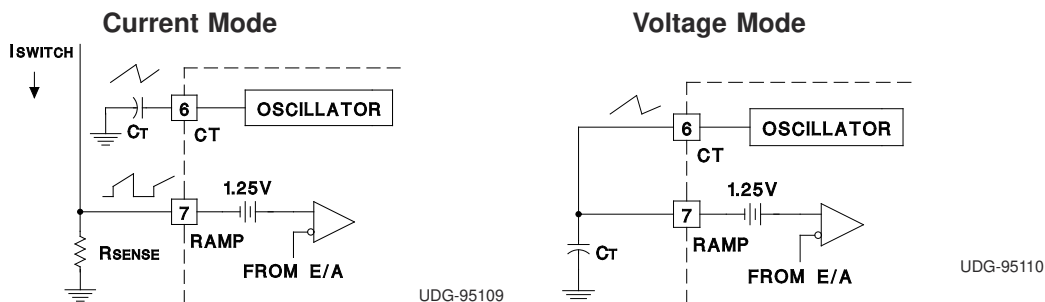
図 7-2. ソフト・スタートとフォルトの波形

### 7.3 ACTIVE LOW OUTPUTS DURING UVLO

The UVLO function forces the outputs to be low and considers both VCC and VREF before allowing the chip to operate.



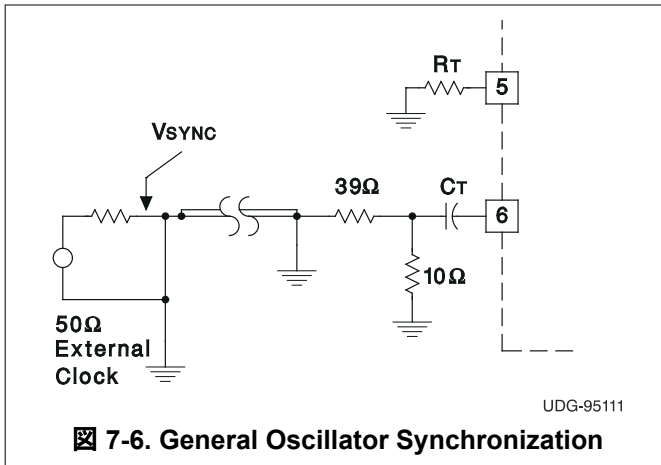
### 7.4 CONTROL METHODS



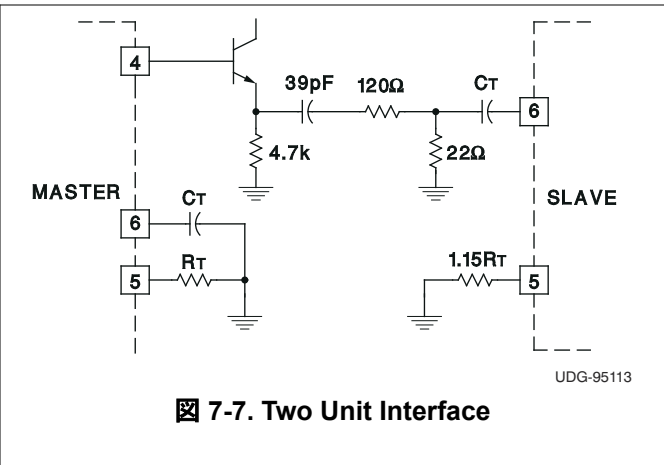
**7-5. Control Methods**

### 7.5 SYNCHRONIZATION

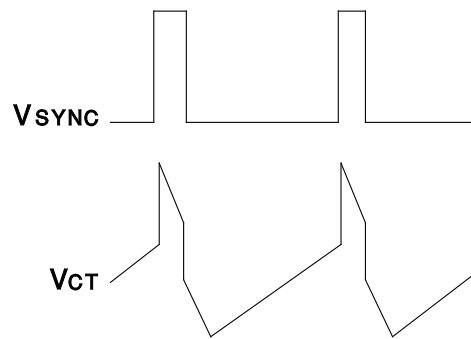
The oscillator can be synchronized by an external pulse inserted in series with the timing capacitor. Program the free running frequency of the oscillator to be 10% to 15% slower than the desired synchronous frequency. The pulse width should be greater than 10 ns and less than half the discharge time of the oscillator. The rising edge of the CLK/LEB pin can be used to generate a synchronizing pulse for other chips. Note that the CLK/LEB pin no longer accepts an incoming synchronizing signal.



7-6. General Oscillator Synchronization



7-7. Two Unit Interface



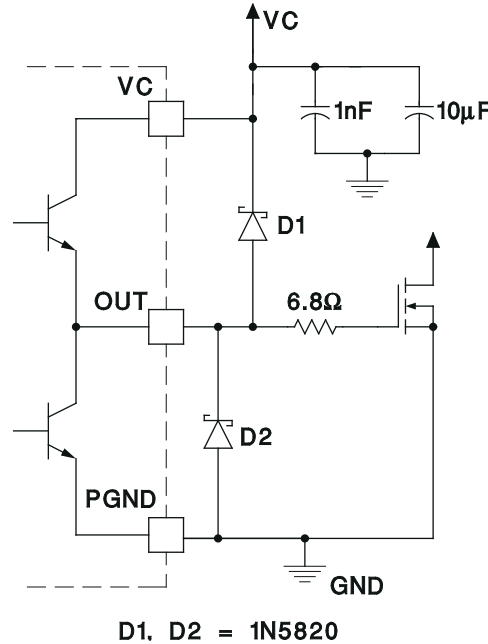
UDG-95112

7-8. Operational Waveforms

## 7.6 HIGH CURRENT OUTPUTS

Each totem pole output of the UC3823A and UC3823AB, UC3825A, and UC3825B can deliver a 2-A peak current into a capacitive load. The output can slew a 1000-pF capacitor by 15 V in approximately 20 ns. Separate collector supply (VC) and power ground (PGND) pins help decouple the device's analog circuitry from the high-power gate drive noise. The use of 3-A Schottky diodes (1N5120, USD245, or equivalent) as shown in the 7-10 from each output to both VC and PGND are recommended. The diodes clamp the output swing to the supply rails, necessary with any type of inductive/capacitive load, typical of a MOSFET gate. Schottky diodes must be used because a low forward voltage drop is required. DO NOT USE standard silicon diodes.

Although they are *single-ended* devices, two output drivers are available on the UC3823A and UC3823B devices. These can be *paralleled* by the use of a 0.5 Ω (noninductive) resistor connected in series with each output for a combined peak current of 4 A.



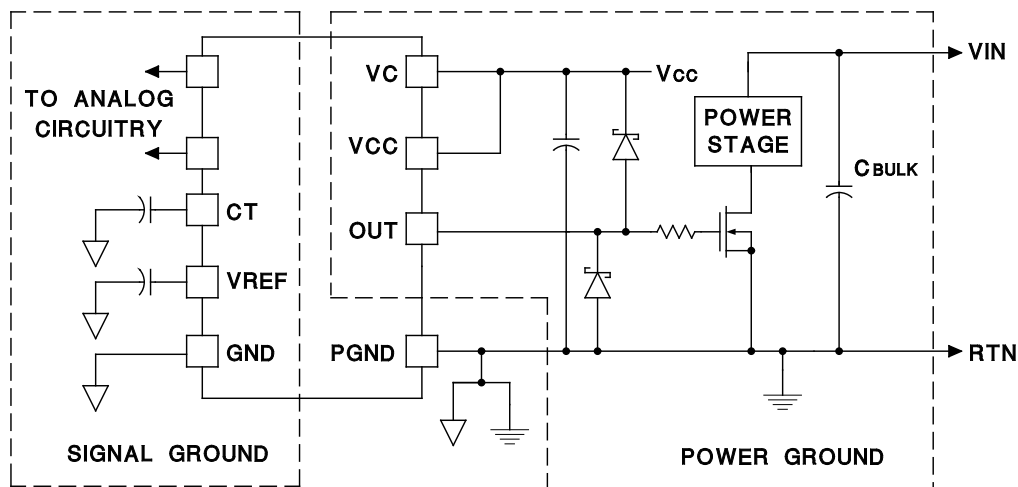
UDG-95114

**7-9. Power MOSFET Drive Circuit**

## 7.7 GROUND PLANES

Each output driver of these devices is capable of 2-A peak currents. Careful layout is essential for correct operation of the chip. A ground plane must be employed. A unique section of the ground plane must be designated for high di/dt currents associated with the output stages. This point is the power ground to which the PGND pin is connected. Power ground can be separated from the rest of the ground plane and connected at a single point, although this is not necessary if the high di/dt paths are well understood and accounted for. VCC should be bypassed directly to power ground with a good high frequency capacitor. The sources of the power MOSFET should connect to power ground as should the return connection for input power to the system and the bulk input capacitor. The output should be clamped with a high current Schottky diode to both VCC and PGND. Nothing else should be connected to power ground.

VREF should be bypassed directly to the signal portion of the ground plane with a good high frequency capacitor. Low ESR/ESL ceramic 1-mF capacitors are recommended for both VCC and VREF. All analog circuitry should likewise be bypassed to the signal ground plane.

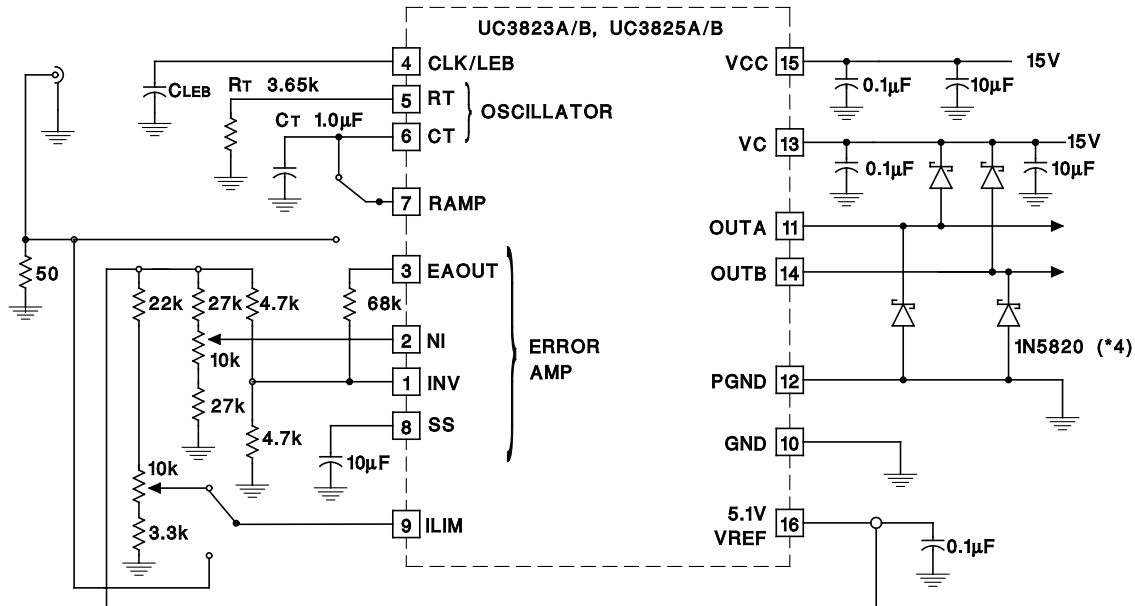


UDG-95115

**7-10. Ground Planes Diagram**

## 7.8 OPEN LOOP TEST CIRCUIT

This test fixture is useful for exercising many functions of this device family and measuring their specifications. As with any wideband circuit, careful grounding and bypass procedures should be followed. The use of a ground plane is highly recommended.



UDG-95116

7-11. Open Loop Test Circuit Schematic

## 8 Device and Documentation Support

### 8.1 Documentation Support

### 8.2 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on [ti.com](https://www.ti.com). Click on *Subscribe to updates* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

### 8.3 サポート・リソース

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### 8.4 Trademarks

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### 8.5 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

### 8.6 Glossary

[TI Glossary](#) This glossary lists and explains terms, acronyms, and definitions.

## 9 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

**PACKAGING INFORMATION**

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
5962-87681022A	ACTIVE	LCCC	FK	20	55	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962- 87681022A UC1825AL/ 883B	<a href="#">Samples</a>
5962-8768102EA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-8768102EA UC1825AJ/883B	<a href="#">Samples</a>
5962-89905022A	ACTIVE	LCCC	FK	20	55	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962- 89905022A UC1823AL/ 883B	<a href="#">Samples</a>
5962-8990502EA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-8990502EA UC1823AJ/883B	<a href="#">Samples</a>
5962-8990502VEA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-8990502VE A UC1823AJQMLV	<a href="#">Samples</a>
UC1823AJ	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	UC1823AJ	<a href="#">Samples</a>
UC1823AJ883B	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-8990502EA UC1823AJ/883B	<a href="#">Samples</a>
UC1823AL	ACTIVE	LCCC	FK	20	55	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	UC1823AL	<a href="#">Samples</a>
UC1823AL883B	ACTIVE	LCCC	FK	20	55	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962- 89905022A UC1823AL/ 883B	<a href="#">Samples</a>
UC1825AJ	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	UC1825AJ	<a href="#">Samples</a>
UC1825AJ883B	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-8768102EA UC1825AJ/883B	<a href="#">Samples</a>
UC1825AL	ACTIVE	LCCC	FK	20	55	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	UC1825AL	<a href="#">Samples</a>
UC1825AL883B	ACTIVE	LCCC	FK	20	55	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962- 87681022A UC1825AL/ 883B	<a href="#">Samples</a>



Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
UC2823ADW	ACTIVE	SOIC	DW	16	40	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	UC2823ADW	<a href="#">Samples</a>
UC2823ADWTR	ACTIVE	SOIC	DW	16	2000	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	UC2823ADW	<a href="#">Samples</a>
UC2823AN	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	UC2823AN	<a href="#">Samples</a>
UC2823BDW	ACTIVE	SOIC	DW	16	40	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	UC2823BDW	<a href="#">Samples</a>
UC2825ADW	ACTIVE	SOIC	DW	16	40	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	UC2825ADW	<a href="#">Samples</a>
UC2825ADWG4	ACTIVE	SOIC	DW	16	40	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	UC2825ADW	<a href="#">Samples</a>
UC2825ADWTR	ACTIVE	SOIC	DW	16	2000	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	UC2825ADW	<a href="#">Samples</a>
UC2825ADWTRG4	ACTIVE	SOIC	DW	16	2000	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	UC2825ADW	<a href="#">Samples</a>
UC2825AN	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	UC2825AN	<a href="#">Samples</a>
UC2825ANG4	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	UC2825AN	<a href="#">Samples</a>
UC2825BDW	ACTIVE	SOIC	DW	16	40	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	UC2825BDW	<a href="#">Samples</a>
UC2825BDWG4	ACTIVE	SOIC	DW	16	40	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	UC2825BDW	<a href="#">Samples</a>
UC2825BN	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	UC2825BN	<a href="#">Samples</a>
UC3823ADW	ACTIVE	SOIC	DW	16	40	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	0 to 70	UC3823ADW	<a href="#">Samples</a>
UC3823ADWTR	ACTIVE	SOIC	DW	16	2000	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	0 to 70	UC3823ADW	<a href="#">Samples</a>
UC3823AN	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	0 to 70	UC3823AN	<a href="#">Samples</a>
UC3823BDW	ACTIVE	SOIC	DW	16	40	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	0 to 70	UC3823BDW	<a href="#">Samples</a>
UC3823BDWTR	ACTIVE	SOIC	DW	16	2000	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	0 to 70	UC3823BDW	<a href="#">Samples</a>
UC3825ADW	ACTIVE	SOIC	DW	16	40	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	0 to 70	UC3825ADW	<a href="#">Samples</a>
UC3825ADWG4	ACTIVE	SOIC	DW	16	40	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	0 to 70	UC3825ADW	<a href="#">Samples</a>
UC3825ADWTR	ACTIVE	SOIC	DW	16	2000	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	0 to 70	UC3825ADW	<a href="#">Samples</a>

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
UC3825ADWTRG4	ACTIVE	SOIC	DW	16	2000	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	0 to 70	UC3825ADW	<a href="#">Samples</a>
UC3825AN	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	0 to 70	UC3825AN	<a href="#">Samples</a>
UC3825ANG4	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	0 to 70	UC3825AN	<a href="#">Samples</a>
UC3825BDW	ACTIVE	SOIC	DW	16	40	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	0 to 70	UC3825BDW	<a href="#">Samples</a>
UC3825BDWTR	LIFEBUY	SOIC	DW	16	2000	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	0 to 70	UC3825BDW	
UC3825BN	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	0 to 70	UC3825BN	<a href="#">Samples</a>

(1) The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSELETE:** TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

**RoHS Exempt:** TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

**Green:** TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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**OTHER QUALIFIED VERSIONS OF UC1823A, UC1823A-SP, UC1825A, UC2825A, UC3823A, UC3825A :**

- Catalog : [UC3823A](#), [UC1823A](#), [UC3825A](#)
- Automotive : [UC2825A-Q1](#)
- Enhanced Product : [UC2825A-EP](#)
- Military : [UC1823A](#), [UC1825A](#)
- Space : [UC1823A-SP](#), [UC1825A-SP](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Enhanced Product - Supports Defense, Aerospace and Medical Applications
- Military - QML certified for Military and Defense Applications
- Space - Radiation tolerant, ceramic packaging and qualified for use in Space-based application

**TAPE AND REEL INFORMATION**

**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
UC2823ADWTR	SOIC	DW	16	2000	330.0	16.4	10.75	10.7	2.7	12.0	16.0	Q1
UC2825ADWTR	SOIC	DW	16	2000	330.0	16.4	10.75	10.7	2.7	12.0	16.0	Q1
UC3823ADWTR	SOIC	DW	16	2000	330.0	16.4	10.75	10.7	2.7	12.0	16.0	Q1
UC3823BDWTR	SOIC	DW	16	2000	330.0	16.4	10.75	10.7	2.7	12.0	16.0	Q1
UC3825ADWTR	SOIC	DW	16	2000	330.0	16.4	10.75	10.7	2.7	12.0	16.0	Q1
UC3825BDWTR	SOIC	DW	16	2000	330.0	16.4	10.75	10.7	2.7	12.0	16.0	Q1

**TAPE AND REEL BOX DIMENSIONS**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
UC2823ADWTR	SOIC	DW	16	2000	356.0	356.0	35.0
UC2825ADWTR	SOIC	DW	16	2000	356.0	356.0	35.0
UC3823ADWTR	SOIC	DW	16	2000	356.0	356.0	35.0
UC3823BDWTR	SOIC	DW	16	2000	356.0	356.0	35.0
UC3825ADWTR	SOIC	DW	16	2000	356.0	356.0	35.0
UC3825BDWTR	SOIC	DW	16	2000	356.0	356.0	35.0

**TUBE**


\*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
5962-87681022A	FK	LCCC	20	55	506.98	12.06	2030	NA
5962-89905022A	FK	LCCC	20	55	506.98	12.06	2030	NA
UC1823AL	FK	LCCC	20	55	506.98	12.06	2030	NA
UC1823AL883B	FK	LCCC	20	55	506.98	12.06	2030	NA
UC1825AJ	J	CDIP	16	25	506.98	15.24	13440	NA
UC1825AL	FK	LCCC	20	55	506.98	12.06	2030	NA
UC1825AL883B	FK	LCCC	20	55	506.98	12.06	2030	NA
UC2823ADW	DW	SOIC	16	40	507	12.83	5080	6.6
UC2823AN	N	PDIP	16	25	506	13.97	11230	4.32
UC2823BDW	DW	SOIC	16	40	507	12.83	5080	6.6
UC2825ADW	DW	SOIC	16	40	507	12.83	5080	6.6
UC2825ADWG4	DW	SOIC	16	40	507	12.83	5080	6.6
UC2825AN	N	PDIP	16	25	506	13.97	11230	4.32
UC2825ANG4	N	PDIP	16	25	506	13.97	11230	4.32
UC2825BDW	DW	SOIC	16	40	507	12.83	5080	6.6
UC2825BDWG4	DW	SOIC	16	40	507	12.83	5080	6.6
UC2825BN	N	PDIP	16	25	506	13.97	11230	4.32
UC3823ADW	DW	SOIC	16	40	507	12.83	5080	6.6
UC3823AN	N	PDIP	16	25	506	13.97	11230	4.32
UC3823BDW	DW	SOIC	16	40	507	12.83	5080	6.6
UC3825ADW	DW	SOIC	16	40	507	12.83	5080	6.6
UC3825ADWG4	DW	SOIC	16	40	507	12.83	5080	6.6
UC3825AN	N	PDIP	16	25	506	13.97	11230	4.32
UC3825ANG4	N	PDIP	16	25	506	13.97	11230	4.32
UC3825BDW	DW	SOIC	16	40	507	12.83	5080	6.6
UC3825BN	N	PDIP	16	25	506	13.97	11230	4.32

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